

## 2019 AWWA Water Audit Level 1 Validation

Water System Name:

Water System ID Number:

Water Audit Period:

### Water Audit & Water Loss Improvement Steps:

Steps taken in preceding year to increase data validity, reduce real loss and apparent loss as informed by the annual validated water audit:

Changing out customer meters.

### Certification Statement by Utility Executive:

This water loss audit report meets the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34 and has been prepared in accordance with the method adopted by the American Water Works Association, as contained in their manual, *Water Audits and Loss Control Programs, Manual M36, Fourth Edition* and in the Free Water Audit Software version 5.

Travis Holvoak

Executive Name (Print)

Water Superintendent

Executive Position

Travis Holvoak

Signature

11/2/2020

Date

Utility Provided

## 2019 Water Audit Level 1 Validation - Review Document

### Audit Information:

Utility: Hemet                      PWS ID: 3310016

System Type: Potable              Audit Period: Fiscal Year 2019/20

Utility Representation: Travis Holyoak, Brian (WQ/Conservation)

Validation Date: 10/22/2020              Call Time: 12:00am              Sufficient Supporting Documents Provided: Yes

### Validation Findings & Confirmation Statement:

#### Key Audit Metrics:

Data Validity Score: 60              Data Validity Band (Level): Band III (51-70)

ILI: 0.52              Real Loss: 9.41 (gal/conn/day)    Apparent Loss: 3.49 (gal/conn/day)

Non-Revenue Water as a Percentage of Operating Costs: 1.0%

#### Certification Statement by Validator:

This water loss audit report has been Level 1 validated per the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34.

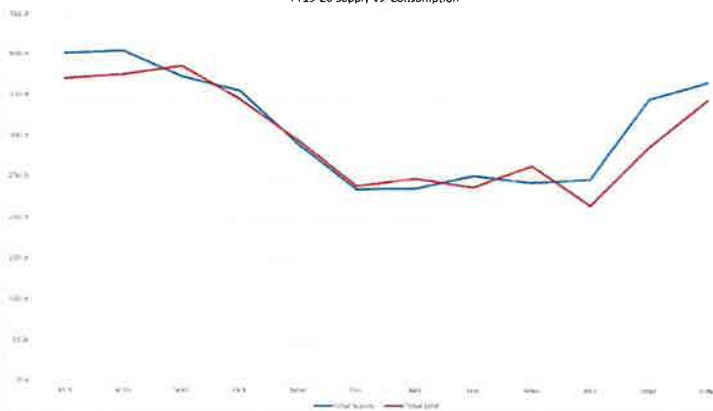
All recommendations on volume derivation and Data Validity Grades were incorporated into the water audit. ☒

### Validator Information:

Water Audit Validator: Larry Lewison, Drew Blackwell              Validator Qualifications: Contractor for California Water Loss TAP

Validator Provided

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
1	Volume from Own Sources	VOS	7	<p><b>Supply meter profile:</b> Water is from groundwater wells – flow measured via meters. Three active wells (2A, 10A &amp; 12) in operation during the audit period. Wells 2A &amp; 12 measured with prop meters and 10A by U/S (Octave) Other wells (6) have been removed from operation based on quality issues. No lines going back to the facility downstream of the meters.</p> <p><b>VOS input derived from:</b> Volumes derived from manual meter readings conducted daily while wells are in operation. Flowrates are visible on SCADA, but no totalizer is set up.</p> <p><b>Comments:</b> Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed. Meter accuracy tests provided for Well 2 and 12. Well 2 produces 81% of volume. Well #10A has new U/S octave meter and a pump efficiency test was provided but no meter accuracy result was derived.</p>	<p><b>Percent of own supply metered:</b> 100%</p> <p><b>Signal calibration frequency:</b> Signal output from supply meters is not utilized in system operations or tabulation of VOS. However, some meters can be calibrated and should be checked annually.</p> <p><b>Volumetric testing frequency:</b> 3rd party testing is conducted every year and Edison testing is conducted every other year for well pump efficiency testing (method varies based on assigned tester). McCalls comparative test results showed minimal inaccuracy (ave 99.2%) for the 2 meters tested.</p> <p><b>Volumetric testing method:</b> Insertion type.</p> <p><b>Percent of own supply tested and/or calibrated:</b> 92%.</p> <p><b>Comments:</b> Limiting criteria for DVG is availability of annual calibration documentation for applicable meters.</p>
2	VOS Master Meter & Supply Error Adjustment	VOS MMSEA	3	<p><b>Input derivation:</b> Left blank in absence of available test data.</p> <p><b>Net storage change included in MMSEA input:</b> No.</p> <p><b>Comments:</b> No additional comments.</p>	<p><b>Supply meter read frequency:</b> Daily.</p> <p><b>Supply meter read method:</b> Manual and automatic logging.</p> <p><b>Frequency of data review for trends &amp; anomalies:</b> Monthly.</p> <p><b>Storage levels monitored in real-time:</b> Yes.</p> <p><b>Comments:</b> No volume input in MMSEA for Net storage change as limiting criteria for DVG.</p>
3	Water Imported	WI	5	<p><b>Import meter profile:</b> From EMWD – connections with Bottletree (Octave), Fruitvale, Seven hills, Searl and Palm (Octave). Water source is a collaborative project that allows Hemet an allocation, but they do not have a direct connection to source, they pay a wheeling fee only to the neighboring system. Fruitvale had a new meter installed. L.H. not active during audit year.</p> <p><b>WI input derived from:</b> Totalization of volumes per redundant meter reads by utility. Flowrates are read by SCADA (except Fruitvale &amp; Searl) but volumes are not totalized or archived.</p> <p><b>Comments:</b> Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed. Meter accuracy reports not provided.</p>	<p><b>Percent of import supply metered:</b> 100%</p> <p><b>Signal calibration frequency:</b> None.</p> <p><b>Volumetric testing frequency:</b> Within last 5 years but less than annually.</p> <p><b>Volumetric testing method:</b> n/a.</p> <p><b>Percent of import supply volumetrically tested:</b> n/a.</p> <p><b>Comments:</b> Limiting criteria for DVG is availability of testing/calibration documentation.</p>

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
4	WI Master Meter & Supply Error Adjustment	WI MMSEA	3	<p><b>Input derivation:</b> Left blank in absence of available test data.</p> <p><b>Comments:</b> No additional comments.</p>	<p><b>Import meter read frequency:</b> Daily, when in use.</p> <p><b>Import meter read method:</b> Manual and automatic logging.</p> <p><b>Frequency of data review for trends &amp; anomalies:</b> Each business day.</p> <p><b>Comments:</b> No additional comments.</p>
5	Water Exported	WE	n/a		
6	WE Master Meter & Supply Error Adjustment	WE MMSEA	n/a		
7	Billed metered	BMAC	5	<p><b>Customer meter profile:</b> Normal customers tracked in billing system. Lake Hemet MWD operations and 'temporary water service' are billed but tracked outside of the billing system. (See UUAC)</p> <p><b>Age profile:</b> Average ~6 years. ~ 3/4 of system replaced in 2019 as part of AMI conversion (End of 2020 projected completion date).</p> <p><b>Reading system:</b> Mixture of AMR and AMI.</p> <p><b>Read frequency:</b> Monthly.</p> <p><b>Comments:</b> Lag-time correction is not employed in input derivation. Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.</p> 	<p><b>Percent of customers metered:</b> 100%</p> <p><b>Small meter testing policy:</b> Reactive - complaint based or flagged-consumption testing only.</p> <p><b>Number of small meters tested/year:</b> ~2</p> <p><b>Large meter testing policy:</b> Reactive - complaint based or flagged-consumption testing only.</p> <p><b>Number of large meters tested/year:</b> Not quantified, but known to be small.</p> <p><b>Meter replacement policy:</b> Typically replace old meters. Ongoing via meter conversion project at ~50% each year – 16/17, 17/18 and FY18/19.</p> <p><b>Number of replacements/year:</b> Not quantified, but known to be small.</p> <p><b>Billing data auditing:</b> Standard billing QC, plus review of volumes by use type each billing cycle. Pull any meter that is 25% higher/lower and manually inspected.</p> <p><b>Comments:</b> DVG based on very limited meter testing requirements. Proxy for meter conversion project has expired.</p>
8	Billed unmetered	BUAC	n/a		

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
9	Unbilled metered	UMAC	n/a		
10	Unbilled unmetered	UUAC	10	<p><b>Profile:</b> Operational uses and fire department usage. Tracked monthly with event &amp; site specific estimation methods.</p> <p><b>Comments:</b> No additional comments. Backed out street sweeping and temps service</p>	<p><b>Comments:</b> DVG based on all uses tracked and estimated by event with formula.</p>
11	Unauthorized consumption	UC	5	<p><b>Comments:</b> Default input applied.</p>	<p><b>Comments:</b> Default grade applied.</p>
12	Customer metering inaccuracies	CMI	3	<p>See BMAC comments regarding meter testing &amp; replacement activities.</p> <p><b>Input derivation:</b> Rudimentary estimate of 0.5%</p> <p><b>Comments:</b> No additional comments.</p>	<p><b>Characterization of meter testing:</b> Limited (upon request AND consumption flag only).</p> <p><b>Characterization of meter replacement:</b> Routine (proactive), but limited.</p> <p><b>Comments:</b> No additional comments.</p>
13	Systematic data handling errors	SDHE	5	<p><b>Comments:</b> Default input applied.</p>	<p><b>Comments:</b> Default grade applied.</p>
14	Length of mains	Lm	7	<p><b>Input derivation:</b> Annual additions to legacy mileage number.</p> <p><b>Hydrant leads included:</b> Yes.</p> <p><b>Comments:</b> Carter graph program. General locations.</p>	<p><b>Mapping format:</b> Paper, with GIS in early development.</p> <p><b>Asset management database:</b> Not currently in place.</p> <p><b>Map updates &amp; field validation:</b> Accomplished through normal work order processes.</p> <p><b>Comments:</b> No additional comments.</p>
15	Number of service connections	Ns	9	<p><b>Input derivation:</b> Standard report run from billing system.</p> <p><b>Basis for database query:</b> Account ID - non-premise based.</p> <p><b>Comments:</b> No additional comments.</p>	<p><b>CIS updates &amp; field validation:</b> Accomplished through normal meter reading processes.</p> <p><b>Estimated error of total count within:</b> 1%.</p> <p><b>Comments:</b> Lack of GIS system as limiting criteria for DVG.</p>
16	Ave length of cust. service line	Lp	10	<p><b>Comments:</b> Default input and grade applied, as customer meters are typically located at the property boundary given California climate.</p>	
17	Average operating pressure	AOP	5	<p><b>Number of zones, general profile:</b> 1 zone, water is sourced/stored generally from the East and gravity pressure with terrain drop to the West.</p> <p><b>Typical pressure range:</b> 50 - 110</p> <p><b>Input derivation:</b> Inferred from observations of pressure readings in field or review of pressure measurements.</p> <p><b>Comments:</b> No additional comments.</p>	<p><b>Extent of static pressure data collection:</b> Hydrant pressures taken during routine system flushing and/or hydrant testing.</p> <p><b>Characterization of real-time pressure data collection:</b> Basic - telemetry or pressure logging at boundary points (supply locations, tanks, PRVs, boosters).</p> <p><b>Hydraulic model:</b> None currently in place.</p> <p><b>Comments:</b> No additional comments.</p>

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
18	Total annual operating cost	TAOC	9	<p><b>Input derivation:</b> From budgeting report – represents 19/20 budget figure, not actual.</p> <p><b>Comments:</b> Confirmed costs limited to water only, and water debt service included.</p>	<p><b>Frequency of internal auditing:</b> Annually.</p> <p><b>Frequency of third-party CPA auditing:</b> Annually.</p> <p><b>Comments:</b> DVG based on budgeted figures used rather than actual.</p>
19	Customer retail unit cost	CRUC	10	<p><b>Input derivation:</b> Simple rate structure with only a single volumetric rate. Sewer charges are not based on water meter readings. Sewer revenues are not applicable.</p> <p><b>Comments:</b> No additional comments.</p>	<p><b>Characterization of calculation:</b> Composite via simple rate structure with only a single rate. Input calculations have been reviewed by an M36 water loss expert.</p> <p><b>Comments:</b> No additional comments.</p>
20	Variable production cost	VPC	3	<p><b>Supply profile:</b> Own sources and import supply.</p> <p><b>Primary costs included:</b> Treatment chemicals, supply &amp; distribution power, and wheeling costs. Input costs were estimated.</p> <p><b>Secondary costs included:</b> None currently included.</p> <p><b>Comments:</b> Input revised from \$150 to \$300 based on previous years.</p>	<p><b>Characterization of calculation:</b> Primary costs only. Input calculations have not been reviewed by an M36 water loss expert.</p> <p><b>Comments:</b> No additional comments.</p>

### Key Audit Metrics

(~)	VALIDITY	Data Validity Score: 60	Data Validity Band (Level): Band III (51-70)	
(#)	VOLUME	ILI: 0.52	Real Loss: 9.41 (gal/conn/day)	Apparent Loss: 3.49 (gal/conn/day)
(\$)	VALUE		Annual Cost of Real Losses: \$29,500	Annual Cost of Apparent Losses: \$76,128

### Infrastructure & Water Loss Management Practices:

Infrastructure age profile: Average ~50 years.  
service connections to copper.

Infrastructure replacement policy (current, historic): Currently finishing replacement of all

Estimated main failures/year: 4

Estimated service failures/year: 26

Extent of proactive leakage management: None currently in place.

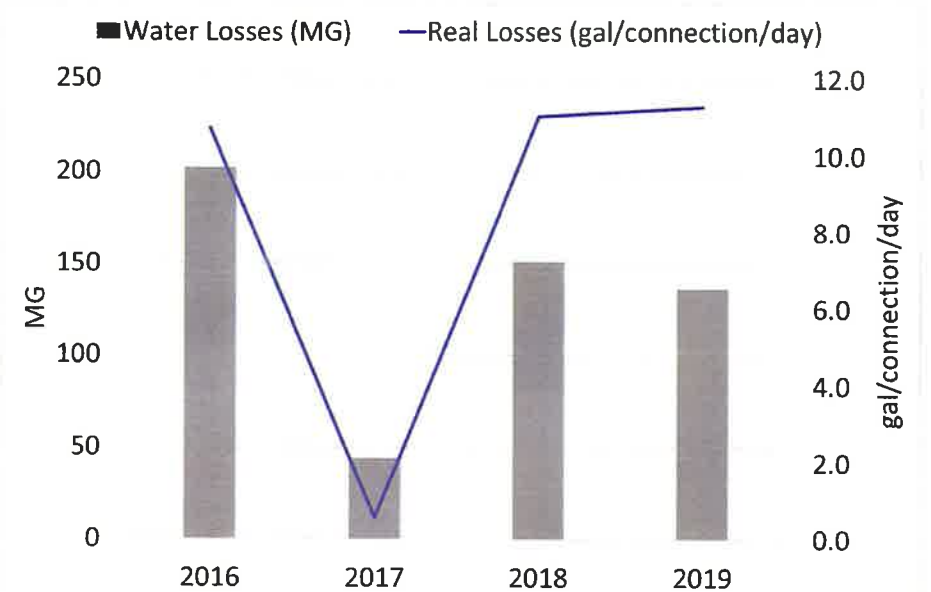
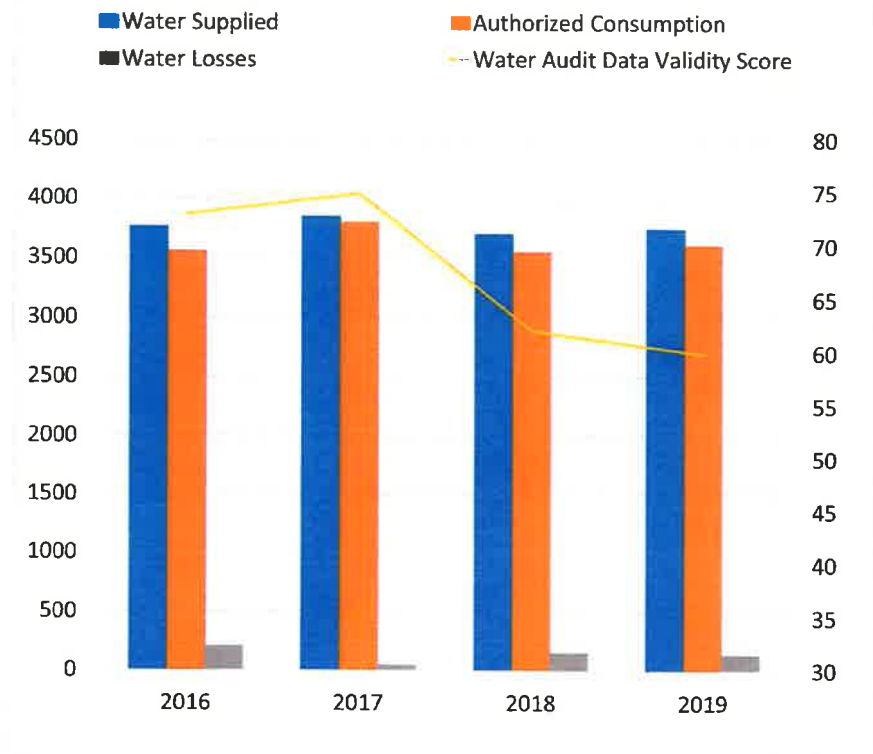
Other water loss management comments: Service line replacement program.

### Comments on Audit Metrics & Validity Improvements:

The Infrastructure Leakage Index (ILI) of 0.52 describes a system that experiences leakage at 0.52 times the modeled technical minimum for its system characteristics.

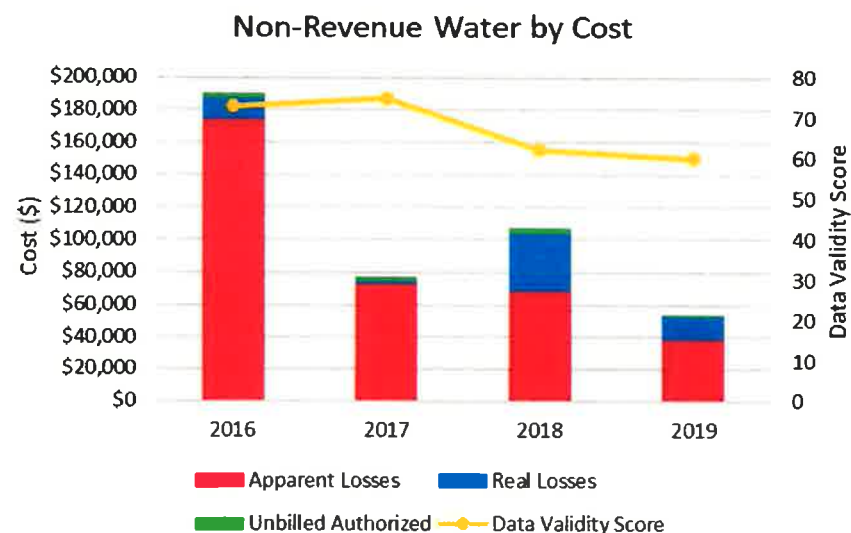
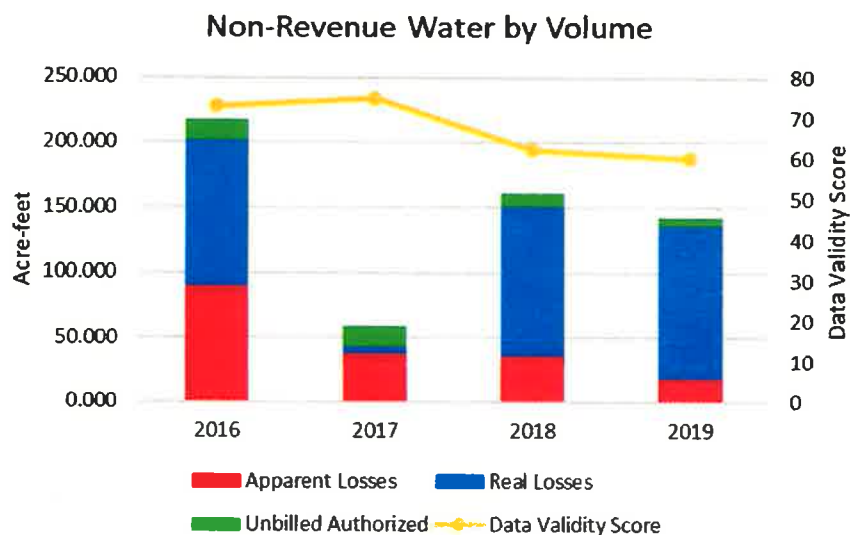
While this system may experience low volumes of leakage, the ILI after level 1 validation indicates that **advanced validation may be warranted before conclusions can be made regarding the system's leakage. At least one of the following scenarios may contribute to this result:**

- **Water Supplied (both Own Source and Imported Water) may be understated.** This can occur if supply meters are under-registering more significantly than is currently reflected in the Master Meter Error & Supply Adjustment (MMSEA). This can also occur if the supply volumes include uncorrected inaccuracies in the data archives due to data gaps or SCADA formula errors.
- **Authorized consumption may be overstated.** This can occur if the BMAC input includes any non-potable volumes, duplication of potable volumes, or inclusion of potable volumes from a different system. Consider a Level 2 validation on the billing database.



The largest component of non-revenue water by volume has been consistently real losses over the last four years however, when evaluated by cost the largest component is clearly the value of apparent losses. Data Validity has decreased slightly in the past couple years. A reasonable next step to consider would be to **develop a loss profiles** through component analysis as well as an **economic analysis** to establish NRW recovery targets.





The Data Validity Score falling within Band III (51-70) suggests that next steps may be focused simultaneously on improving data reliability and evaluating cost-effective interventions for water & revenue loss recovery. Opportunities to improve the reliability of audit inputs and outputs include:

- Improved understanding of Supply Meter (Own or Import) Master Meter Error: consider adopting or increasing the rigor of a source meter volumetric testing and calibration program, informed by the guidance provided in AWWA Manual M36 – Appendix A.
  - i. Maintain annual testing practice.
  - ii. Request volumetric accuracy testing for the import meters.
  - iii. Add annual calibration of applicable meters
- Temporal alignment of Billed Metered Authorized Consumption with Water Supplied: consider pro-rating the first and last months of the audit period to better align consumption with actual dates of use and using read date as basis for reporting.
- Improved estimation of CMI: After the new meter stock has been installed, consider a customer meter testing program which tests a sample of random meters whose stratification (by size, age, or other characteristics) represents the entire customer meter stock.

### Further Recommendations

Since Data Validity Score is >50, consider follow-on implementations as described in the AWWA M36 Manual, once the annual water audit is established:

- Conduct a Real Loss Component Analysis to develop your leakage profile.
- Conduct an Apparent Loss Component Analysis to develop your apparent loss profile.
- Cost-benefit analysis & target setting for water loss components.
- Design & implement water loss control program for cost-effective interventions.

